

**„BABEȘ-BOLYAI” UNIVERSITY
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Ph.D. THESIS

SUMMARY

**ANCESTRAL DETERMINANTS OF PRICE
INFORMATIVENESS ON THE STOCK MARKETS**

Ph.D. supervisor

Prof. Univ. Dr. Alexandru TODEA

Ph.D. student

Daiana Florina PETRESCU

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INTRODUCTION

Informational efficiency is a fundamental hypothesis in financial theories in recent decades. The theory has multiple implications on the capital market, affecting investors and regulators alike. Its importance lies in the fact that it helps to fulfill one of the basic functions of capital markets: financing the real economy by directing resources to the most competitive businesses. However, as its popularization increases, numerous studies conducted by researchers around the world have brought to light contradictory results. Therefore, more current approaches to the informational efficiency concept make the transition from classical tests of informational efficiency (absolute efficiency) to variants closer to reality (relative efficiency). Automatically, the measuring of informational efficiency has also changed.

Fama (1970) defines an efficient market as "a market in which prices always fully reflect all the available information". At the same time, prices are one of the most important mechanisms that ensure the connection of capital markets with the real economy. Therefore, the study of stock prices is of the utmost importance, both because prices are a useful tool for measuring the informational efficiency of markets, and especially because a better impounding of information into prices reduces information asymmetry, which leads, finally, to the development of financial markets (Edmans et al., 2017).

Durnev et al. (2003) define price informativeness as the amount of information about future earnings contained in current stock prices. The previous definition is broadly accepted and unchanged over time. The same cannot be said, however, about how price informativeness is effectively measured in practice. The literature proposes a variety of measures: Morek et al. (2000), Llorente et al. (2002), and Easley and O'Hara (1992). Also, the determining factors of stock price informativeness are extremely diverse. Among them, we mention the level of financial development, the number of analysts following the stocks, structural factors, legislation, etc., and the list remains open.

After the publication of the seminal works of Spolaore and Wacziarg (2009) and Ashraf and Galor (2013a), which show that the comparative economic development in the world is influenced by genetic variation, in its two forms, genetic distance and genetic diversity, an increasing richer literature studies the effect of such less conventional factors on financial

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markets: Cardella et al. (2018), Giannetti and Zhao (2019). However, the theory of dual inheritance (gene-culture coevolution) shows that it is relatively difficult to disentangle genetic and cultural contributions to people's psychological development, so Enke (2019), in his attempt to explain economic development in the world, uses a different structure, meant to capture both biological and cultural aspects: kinship systems.

This thesis aims to find out whether links similar to those found in the works mentioned above can be found concerning price informativeness. In other words, are ancestral factors responsible for how information is impounded into stock prices? And if so, how can these results be used by regulators to promote a better incorporation of information into stock prices so that the capital market fulfills its most important function, that of financing the real economy, which contributes to increasing well-being?

The motivation of the research comes from the need to understand as thoroughly as possible how the incorporation of information into the price happens. At the same time, previous literature on the influence of genetic factors on economic variables has been greeted with great reluctance by researchers. The present approach aims not only to confirm the results previously obtained in the literature, for a new variable of interest (price informativeness), but also to demonstrate that the influence of ancestral factors is not a predetermined one, which condemns nations to good or bad results; it can be moderated by authorities through adopting various policies meant to improve the incorporation of information into stock prices.

The scope of this research is to analyze new factors with an impact on price informativeness and policies that authorities can use to inhibit the action of adverse factors to the incorporation of information into the price and enhance the beneficial ones.

The research methodology incorporates both the literature review and empirical methods. Starting from the conclusions documented in previous literature, we established the hypotheses of the present thesis, which we then tested empirically, using panel analysis. Also, the conclusions based on the results obtained were reinforced by a complex battery of robustness tests. For the various stages of data processing and estimation of the proposed models, we used several statistical software, such as Matlab, R Studio, and Stata.

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The originality of the paper consists in identifying new determinants of ancestral nature of price informativeness and proposing solutions available to legislators, designed to moderate the influence of these factors.

Chapter 1 briefly presents the history of the capital markets' informational efficiency hypothesis, highlighting the reasons behind the transition to more current approaches, focused on the impounding of information into stock prices and the differences between predictive price efficiency and revealing price efficiency. In this sense, we present the literature review on price informativeness, the models that substantiate it, the methods of measuring it, and the factors demonstrated in the literature as having an impact on price informativeness.

Chapter 2 discusses the many and varied ways in which ancestral factors determine various economic and financial outcomes. One of the most controversial publications in recent literature, the pioneer study of Ashraf and Galor (2013a), which documents a hump-shaped relationship between genetic diversity and economic development in the world, is presented in detail, starting from the measurement of genetic diversity and continuing with the methodology they used and the results they obtained. We did not neglect the criticisms of the model, but we also presented the answers to them and the latest conclusions formulated in this case. The second part of the chapter focuses on a fairly recent paper, in which Enke (2019) demonstrates an inverse link between economic development and another ancestral factor, tight kinship.

Chapter 3 presents the theoretical arguments that formed the basis for formulating the hypotheses from the main analysis of this paper. The empirical confirmation of the hypotheses formulated in this chapter represents, in fact, the identification of new explanatory variables for the differences in the informativeness of the prices around the Globe. These are genetic diversity and kinship. The sample on which the analysis is based, the construction of dependent / independent variables, and the models used to test the formulated hypotheses are discussed. Finally, the results of the estimations and the robustness tests performed are presented.

The last chapter deals, both theoretically and empirically, with the implications of confirming the hypotheses formulated in Chapter 3 and focuses on the solutions available to capital market regulators to increase price informativeness. Several moderating factors of the link between ancestral determinants and price informativeness are identified and confirmed empirically. These are the quality of institutions and the degree of financial market openness to

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foreign investors, in the case of genetic diversity, and the quality of institutions, press freedom, and concentration in groups of companies, in the case of kinship.

Despite the identification and empirical validation in the literature of an impressive number of determinants of the informativeness of stock prices, significant differences, which cannot be explained by them, still remain. In this Ph.D. thesis, we tried to show that ancestral factors: genetic diversity, and kinship relationships, complete this list. Furthermore, we have identified several variables that regulators could act on to reduce their effect on price informativeness. For this reason, we believe that this thesis is a useful tool for researchers, investors, and legislators alike.

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SUMMARY OF CHAPTER 1

PRICE INFORMATIVENESS: THEORETICAL BASIS, QUANTIFICATION POSSIBILITIES, AND EXPLANATORY FACTORS

Chapter 1 presents the main theoretical aspects regarding the impounding of information into stock market prices. Starting from the historical approach of informationally efficient markets, we show that both supporters and opponents of this intensively studied hypothesis in the world of finance bring important theoretical and empirical arguments, so that even today there is no consensus in interpreting the results of informational efficiency studies. The question of how we measure market efficiency has many answers. Price informativeness is certainly one of them.

One of the main mechanisms through which the connection between the capital market and the real economy is made is by prices. The more informative the prices, the less investors suffer from the information asymmetry, thus being more willing to invest in the primary market (Edmans et al., 2017). Durnev et al. (2003) define price informativeness as the amount of information about future earnings contained in current stock prices.

Edmans et al. (2017) compare the concepts of predictive price efficiency (relative to the total amount of information reflected in the price, it is the extent to which prices predict fundamental values) and revealing price efficiency (relative to information that is not already known by the manager, it represents the extent to which prices reveal the information necessary for the efficiency of the real economy) and shows that not only the total amount of information is relevant, but also its source. In other words, a manager will use his information, regardless of the degree to which it is embedded in the price. The utility of the stock price results from how much information previously unknown by the manager can be extracted from the price and used in the decision-making process. The terms predictive and revealing price efficiency were first mentioned by Bond et al. (2012), who distinguished between the two notions of efficiency: the traditional notion of predicting the future value of the firm (predictive efficiency) and revealing price efficiency, ie the extent to which prices reveal the information needed for actual efficiency. The two most well-known theoretical models that substantiate price informativeness are those developed by Dow and Gorton (1997), and Subrahmanyam and Titman (1999).

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If the definition and theoretical models underlying price informativeness are clear notions, accepted in the literature, the same cannot be said about the possibilities of quantifying price informativeness, so their advantages and limitations still constitute a current research direction. In general, there are four broad categories of measures of price informativeness: those based on price nonsynchronicity, those based on volatility (idiosyncratic or systematic), and measures of private information. Of these, the first three categories are intensely debated in the literature. For example, the parametric measure proposed by Morck et al. (2000) is one of the most popular methods in the literature for quantifying informativeness, being used in countless scientific papers to quantify price synchronism. However, it is unclear whether it is a direct or inverse measure of price informativeness (Dasgupta et al., 2010), whether it reflects the existence of private information or “occasional frenzy”, unrelated to specific information (Roll, 1988), or whether it signals the impounding of more firm-specific information into stock prices or poor liquidity of securities (Gassen et al., 2020). Consensus is not reached in the case of idiosyncratic volatility either. Several papers document a direct link between idiosyncratic volatility and price informativeness (Morck et al., 2000; Jin and Myers, 2006), but other studies suggest that higher idiosyncratic volatility is generated by uninformed investors, who may misjudge the equilibrium level of the price or trade in the absence of new information.

Compared to the theory of informational efficiency, which has been one of the most studied hypotheses in the world of finance in the last 50 years, price informativeness and its determinants are just beginning to capture the interest of researchers. Therefore, the empirical literature on this subject is not extremely extensive. However, many factors have already been identified: the number of analysts reporting on the company, the quality of reporting results, the quality of disclosure, the informational environment, investor protection, accounting standards, investor sentiment, transparency, institutional investors, existing information processing technology, and so on. However, the list is far from complete, and this paper is an argument in this regard, in that we identify factors of an ancestral nature that affect the informativeness of prices.

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SUMMARY OF CHAPTER 2

ANTHROPOLOGICAL FACTORS AND THEIR IMPACT ON ECONOMIC RESULTS

Genetic variation is rarely one of the factors that most of the world might think of as one with an influence on various types of economic outcomes. However, there is a vast literature documenting the impact of genetic factors on various human psychological traits that affect economic and financial behavior. One of the intensely studied hypotheses lately brings together the economic/financial field with genetics. Spolaore and Wacziarg (2009) show that genetic distance, a measure associated with the time elapsed since the last common ancestors of two populations, significantly affects differences in income between countries, even in the presence of control variables for geographical distance, climatic, historical, religious or linguistic. Another notion, that of genetic diversity, generates increased interest. A pioneering study, which also served as a guide for this thesis, is the one conducted by Ashraf and Galor (2013a), which shows that genetic diversity has a persistent effect on economic development, with both beneficial and negative influences, suggesting a hump-shaped relationship. It is based on two fundamental pillars, namely:

1. The migratory distance from the cradle of humanity in East Africa has had an adverse effect on the genetic diversity found in ancient indigenous peoples.
2. The existence of an optimal level of genetic diversity that balances the negative aspects of genetic diversity (lack of trust, low cooperation) with the positive aspects (adaptability, increased degree of innovation), thus resulting in the highest economic growth.

Since its inception, the theory of the hump-shaped effect of genetic diversity on economic development has often been confirmed in the literature but is at least as much criticized. D'Alpoim Guedes and colleagues (2013) expressed major reservations about the hypothesis enunciated by Ashraf and Galor, arguing that their arguments are flawed, both in terms of facts and methodology, and warn of the danger that “bad science” (poor quality data and questionable methods) gives rise to. Tang (2016) also shows that when the Eurasian variable is included in the model of the two, it is statistically significant, while the hump-shaped effect between genetic

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diversity and economic development disappears, suggesting that the results obtained by Ashraf and Galor reflect the Eurasian advantage. However, Ashraf and Galor continue to respond to all critics, through a series of works published in recent years, and their conclusions are confirmed by other authors in their work.

Genetic variation is not the only ancestral factor demonstrated in the literature as having a significant influence on economic outcomes. La Ferrara (2010) studies the role of family and family ties on economic development and shows that values and norms passed on to younger generations have a profound impact on individual decisions about fertility, labor market participation, investment in education, and health. He stresses that in poor countries, family and relatives play a crucial role in facilitating trade, in the absence of poorly functioning or even non-existent markets.

Another seminal work, which inspired the empirical analyzes in chapters 3 and 4, is the one conducted by Enke (2019). Analyzing the connection between kinship and the evolution of moral systems, he shows that the historical heterogeneity of the degree of closeness to relatives (in English: kinship) affects societies differently. On the one hand, in societies where the kinship structure is closer, behavior is influenced by common ethical values, such as revenge, purity, disgust, or feelings of shame. On the other hand, in societies characterized by extended, distant kinship, cooperation seems to be imposed by universal ethical values, for example, internalized guilt, altruistic punishments, or the evolution of moralizing religions. The results show that societies with extended kinship ties have a lower level of intra-group favoritism, are more likely to believe in a moralizing god, place less emphasis on common ethical values and disgust, and have more strong global institutions. The results confirm the author's expectations and show that in societies with extended family systems, the greater cooperation is due to the belief in a moralizing god, which corresponds to universal values and impersonal, global institutions. The final analysis of the study addresses the issue of the link between extended/close kinship systems and economic development, on two temporal levels, the pre-industrial period and the contemporary period. In the historical analysis, there is no negative link between societies with close kinship and economic development. However, the contemporary analysis reveals that, starting with the Industrial Revolution, the connection suddenly changes, becoming a negative and statistically significant one. These results are consistent with the idea that universal ethical values, associated with societies characterized by

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extended family ties, have been a growing advantage as technological progress has rewarded specialization, residential mobility, knowledge sharing, and trade with foreigners.

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SUMMARY OF CHAPTER 3

THE IMPACT OF ANCESTRAL FACTORS ON PRICE INFORMATIVENESS

In Chapter 3 we show that genetic diversity and kinship ties are two ancestral factors determining the incorporation of information into stock prices. Their identification is one of the elements of originality of this thesis. For each of them, we start by theoretically substantiating the tested hypotheses.

A good starting point for demonstrating the mechanism by which genetic diversity influences price informativeness is the study published by Ashraf and Galor (2013a). The two showed that the mix between trust and creativity, associated with the existing level of genetic diversity, explains the hump-shaped relationship between genetic diversity and economic development. Their argument for this conclusion is that the positive, beneficial aspects counterbalance the negative aspects of genetic diversity on productivity. These are factors that can also influence price informativeness, so we follow a two-stage process, in which we theoretically argue the link between genetic diversity and trust/creativity and the link between trust/creativity and price informativeness. Following the theoretical demonstration of these links, we formulate the hypothesis that there is a hump-shaped relationship between genetic diversity and price informativeness: prices are most informative at intermediate levels of genetic diversity and informativeness is low in the case of increased/decreased genetic diversity.

Regarding kinship, the negative association with price informativeness is supported by several arguments: the lack of cooperation and trust in high kinship companies leads to the existence of several uninformed investors who will have correlated transactions, the number of transactions based on private information is lower, increasing price synchronicity and thus decreasing their informativeness, individuals are less willing to disclose private information outside the group, due to their low trust in those outside the group, also with a negative impact on price informativeness. On the other hand, in societies with a low kinship score, due to their openness outside the group, individuals will have more idiosyncratic experiences and will give more importance to specific information that does not come from their own group, and

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cooperation between individuals is much more beneficial in obtaining and exploiting private information so that stock prices will have a more pronounced specific component and higher informativeness. Therefore, the hypothesis studied is that in nations where kinship is loose (with a low Kinship score), stock prices are more informative.

In the empirical study, we analyzed an unbalanced panel, consisting of weekly observations in the series of stock prices in 42 countries, of which 22 are developed and 20 are emerging, for 13 years, from 2004 to 2016. Starting with the filters used by Jin and Myers (2006), the sample underwent a series of transformations, before reaching its final form: each year, we excluded the titles that were not listed for at least 26 weeks, as well as the titles with American or global depository certificates (according to the terminology: ADR and GDR). A country is only included in a year if at least 25 titles with valid data remain in that year. We thus obtain an unbalanced panel with data from 39 countries for the entire period under analysis and 3 countries for part of the period. The measures used to quantify price informativeness are one for each category described in Chapter 1: price nonsynchronicity Ψ_j , the measure of private information proposed by Llorente et al. (2002) γ_j , idiosyncratic volatility $\log(\sigma_{\varepsilon,j}^2)$ and systematic volatility $\log(\sigma_{m,j}^2)$.

Similar to Ashraf and Galor (2013a), we included in the models the square of genetic diversity, in order to be able to identify the non-linear relationship between informativeness and genetic diversity. Whatever measure is used to quantify price informativeness, the estimated coefficients confirm the existence of a second-degree type relationship, having as a graphical representation a parabola with the branches down. The introduction in the model of the variables of the genetic component, compared to the benchmark model (which includes only the variables previously identified in the literature as determinants of informativeness) leads to an increase in the adjusted coefficient of determination, meaning that models that include genetic diversity explain more of the variation in price informativeness, thus improving the forecasts. We also notice an increase in both the influence of the genetic component (the coefficients have a higher absolute value) and its significance, when information reflects private information. The main results are also reinforced by the multitude of robustness tests performed. For example, the choice of control variables can always be challenged, given the multitude of factors with a potential impact on price informativeness proposed in the literature. Therefore, we reanalyze the hypothesis using alternative control variables: concentration in

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groups of companies, degree of institutional ownership, financial education, and press freedom. Also, the sample includes both small and young shares, as well as blue-chip shares, respectively the shares of those companies considered reliable, and stable, having a wide recognition in this respect. Kelly (2014) argues that small, young stocks, followed by few analysts, are characterized by less synchronism, incorporating less private information than blue-chip shares, which is why nonsynchronicity may not be the most appropriate measure for price informativeness, especially when the sample is heterogeneous. For this reason, we chose to build a more homogeneous sample, containing only blue-chip titles. Given the criticisms of the theory proposed by Ashraf and Galor, in particular, the danger that the interpretation of the results on the influence of genetic diversity on economic outcomes will lead to unethical policies aimed at changing the level of genetic diversity to achieve economic goals, we also checked how migration affects the relationship between genetic diversity and informativeness. Finally, the main analysis uses parametric models to model the relationship between genetic diversity and price informativeness. For good modeling of the data sample using parametric models, it is necessary that the form of the function between the dependent variable and the explanatory ones is known in advance and, moreover, it needs to be correct. In reality, we cannot always say with full certainty that the form of the function used is the correct one, and the parametric models can, consequently, be incorrectly specified. In this case, the semiparametric models prove useful, as they relax the hypothesis of the a priori knowledge of the correct form of the function, thus allowing more flexible modeling of the data sample. We believe that the results obtained in the main analysis and robustness tests entitle us to state that intermediate levels of genetic diversity are associated with higher price informativeness, while increased genetic diversity/homogeneity is associated with low price informativeness.

Regarding the analysis of kinship, we find an inverse association between tight kinship and price informativeness, both in the case of price nonsynchronicity and the measure of private information. The influence of kinship on price informativeness is at the same time significant from an economic point of view. To make sure that the inverse association found is not a consequence of the genetic diversity of nations, we additionally checked with genetic diversity and its square. The results show that both variables, genetic diversity, and kinship, are significant factors influencing price informativeness and these ancestral factors are not substitutable. Again, we reanalyzed the proposed hypothesis using additional control variables, such as the degree of affiliation of companies to business groups, the protection of minority

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shareholders, financial education, and press freedom. We also tested the link between kinship and price informativeness on a much more homogeneous sample, consisting only of the constituent titles of market indices and we used alternative methods of estimating parameters, using random effects in estimating models. All these robustness tests confirm the inverse association between kinship and price informativeness. This association is statistically more robust when price informativeness reflects private information.

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SUMMARY OF CHAPTER 4

MODERATING FACTORS OF THE RELATIONSHIP BETWEEN FACTORS ANCESTRALS AND PRICE INFORMATIVENESS

The ultimate goal of any scientific endeavor should be that the research results can be used by decision-makers in order to improve the parameters of the studied variable. In this chapter, we set out to identify several solutions that could be applied to improve price informativeness, in the case of each ancestral determinant of informativeness.

There is a rich literature documenting the role of institutions as an engine of technological innovation and capital accumulation. Fernández and Tamayo (2015) make a broad synthesis of the state of knowledge in this field, motivated by the fact that they see institutions as the fundamental cause of long-term economic growth and the development of financial markets. Tamilina and Tamilina (2018) showed that improving the quality of institutions leads to greater social trust. The theoretical literature also provides sufficient examples of how institutions affect innovation activities, but more recently, these links are proven empirically, following studies by Wang (2013), Malik (2020), Trinugroho et al. (2021), and Usman et al. (2021). This literature shows that both the quality of institutions in general (the rule of law, legal institutions, the protection of property rights) and the institutions that regulate the functioning of financial markets, in particular, directly influence the degree of innovation. Faria et al. (2016) show that the main lever through which decision makers can influence long-term economic development is to improve the quality of institutions, not genetic diversity. If institutional quality is a moderating factor in the relationship between genetic diversity and price informativeness, in countries with high institutional quality, we can expect a doubling of the effect of trust on informativeness (in the case of countries with low genetic diversity) and a doubling of the effect of creativity (in the case of countries with high genetic diversity). In this way, for countries with low genetic diversity, the positive effect of increased confidence would dominate the negative effect of low creativity, thus improving price informativeness. Similarly, in countries with high genetic diversity, the positive effect of increased creativity would dominate the negative effect of low confidence. Indeed, the results of estimating models that include institutional quality, in the form of an interaction factor with genetic diversity, confirm that in countries with institutional quality below a certain threshold,

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the classical hump-shaped relationship between genetic diversity and price informativeness is maintained, as there are no factors of an institutional nature to stimulate the incorporation of more information into the price. On the other hand, in countries with an increased quality of institutions, financial systems are more developed and institutions stimulate the development of a richer informational environment, which makes prices incorporate more information.

At the same time, we expect the degree of openness of markets to foreign investors to positively affect price informativeness, for at least two reasons: foreign investors are mostly informed investors, thus directly contributing to higher price informativeness. They can also improve corporate governance, and the financial disclosure regime, and indirectly influence price informativeness. In addition, the informational asymmetry between domestic and foreign investors increases the costs of adverse selection, reducing stock market liquidity. To measure the openness of financial markets to foreign investors, we use data from the Coordinated Portfolio Investment Survey (CPIS) holdings. For each country-year pair in our sample, we calculate the measure of financial market openness to foreign investors as the total value of holdings by foreign investors divided by the market capitalization of the country. The results confirm our expectations: in countries with a low openness, where there is a weak presence of foreign investors, there is a hump-shaped relationship between genetic diversity and price informativeness. On the other hand, in the higher openness stock markets, domestic investors from countries with intermediate genetic diversity, characterized by a more balanced mix between trust and creativity/innovation, may perceive a more intense informational asymmetry than foreign investors. In their case, the costs of adverse selection increase, with a negative impact on the liquidity and efficiency of the stock market. Thus, in countries with a high openness, where there is a strong presence of foreign investors, we find a U-shaped relationship between genetic diversity and price informativeness.

We also identified in previous literature a series of moderating factors for the relationship between price informativeness and kinship. First of all, for the reasons mentioned above, institutional quality can also play a moderating role in this case. Press freedom is another component on which decision-makers can act to improve the informational environment. In this sense, Kim et al. (2014) show that an increase in press freedom is associated with a decrease in price synchronism and an improvement in the informational environment. Therefore, we expect press freedom to act as a moderating factor in the relationship between kinship and price

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informativeness. Also, a high degree of affiliation to a business group is associated with a decrease in the informativeness of the prices of their shares and a decrease in the efficiency of resource allocation (Faccio et al., 2021). Business groups share risks among group members and often transfer capital from excess cash firms to low-income firms and unprofitable group investments (Almeida and Wolfenzon, 2006). In this case, the idiosyncratic shocks will be lower than in the case of companies that are not affiliated with a business group. Moreover, these groups are expected to be more opaque and less willing to disclose private information. Thus, an increase in the degree of affiliation to a business group of companies in a market will lead to an amplification of the relationship between kinship and price informativeness.

The results obtained reveal several aspects. First, for a certain level of kinship, an improvement in the quality of institutions is accompanied by a decrease in price informativeness due to the increase in synchronism. Similar results are obtained in the case of press freedom and business groups. In the case of the measure of private information, improving the quality of institutions and press freedom is accompanied by the incorporation of more private information into prices, while increasing the concentration in business groups increases opacity and decreases the volume of private information impounded into prices. In the case of institutional quality and press freedom, the results show that their improvement is accompanied by both a greater specific and market variation, as a consequence of a richer information environment. On the other hand, if we look at the size of the estimates of the parameters of the interaction variables we notice that, in the case of market variation, they are larger. It is then concluded that improving the quality of institutions and press freedom has beneficial effects on the incorporation of specific information, but is also accompanied by a stronger incorporation of market information, which amplifies price synchronism. Therefore, regulators can act to increase the informativeness of prices by improving the quality of institutions and press freedom, and respectively by limiting the concentration of companies in business groups.

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CONCLUDING REMARKS AND FUTURE RESEARCH DIRECTIONS

Two reference studies in the literature (Ashraf and Galor, 2013a; Enke, 2019) have shown that genetic factors, determined tens of thousands of years ago, during human migration from Africa, as well as socio-cultural factors, modeled throughout history, through the adopted kinship systems, have significantly influenced the economic development of contemporary countries. Specifically, the different mixes of trust and creativity associated with different levels of genetic diversity of populations around the globe induce a hump-shaped relationship between economic development and genetic diversity. At the same time, tighter kinship inhibits trust and cooperation with foreigners, leading to weaker economic outcomes.

Recent approaches to price efficiency focus on how information is impounded into prices, and how informative prices are. In this regard, we contribute to the literature on price informativeness, showing that ancestral factors, in this case, genetic diversity and kinship, are important but neglected factors so far, which differentiate price informativeness in different countries.

In terms of genetic diversity, we show that intermediate levels of genetic diversity are associated with higher price informativeness, while increased genetic diversity/homogeneity is associated with low price informativeness. The use of different measures for price informativeness, alternative data samples, different estimation methods, or additional control variables are all ways to test the robustness of results; they do not change the previous conclusion. We also show that migration policy cannot be used to significantly change genetic diversity in the short term, and the relationship between genetic diversity and price informativeness remains unchanged. On the other hand, the relationship can be influenced by acting through internal and external factors. First, the quality of institutions can influence this relationship internally; when the institutional quality is high, the shape of the relationship changes and becomes U-shaped (if the informativeness is measured by nonsynchronicity; when the informativeness reflects private information, the relationship disappears completely). This means that in countries with high institutional quality, nations with intermediate genetic diversity incorporate more market information, while nations with high/low genetic diversity incorporate more specific information. Secondly, the openness of financial markets to foreign investors induces the same changes in the relationship between genetic diversity and price

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informativeness, as in the case of the quality of institutions; more precisely, when the openness of the markets is above a certain threshold, the hump-shaped relationship is reversed and becomes a U-shaped one.

Regarding kinship, we have shown that there is an inverse association between price informativeness and close family ties. The looser the family ties, the greater the price informativeness is. Again, the results are robust to the inclusion in the model of additional control variables, alternative samples, and other estimation methods. We also show that improving press freedom and the quality of institutions and limiting the concentration of companies in business groups are channels through which the authorities can act to increase price informativeness in countries with tight kinship.

The empirical approaches used in this thesis suffer from several limitations. First, the ancestral variables of interest, genetic diversity, and kinship have no time variability. Moreover, it is difficult to support the hypothesis that these variables change significantly in the 13 years of our study, their change may only occur over much longer periods. Because they do not have variability, the association between them and price informativeness is generated by the differences between the countries. At the same time, the invariance over time of these variables made it impossible to use fixed effects on countries, the only treatment of heterogeneity being possible with random effects. Second, the study focused on a cross-section analysis of the countries and not on individual titles, thus omitting several important control variables specific to the company that influence the informativeness of stock prices. However, estimation by country and not by firm is frequently used in the literature because, in the case of firms, their number is very different from one country to another and has a negative impact on estimates. Thirdly, it would have been desirable to use more accurate stock price informativeness measures, such as PIN, rather than nonsynchronicity of prices. Unfortunately, such a measure requires the use of intraday data, and these quotations are not available for the vast majority of emerging markets. Last but not least, the theoretical arguments formulated in favor of the associations between ancestral measures and price informativeness are not based on mathematical models, but only on a series of theoretical arguments based on the literature. Given the complexity of the links investigated, it was quite difficult to develop mathematical models.

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The impact of ancestral factors on the development and functioning of capital markets is a pioneering literature at the beginning of the road. We note the reference study of Ang and Kumar (2014), which shows that genetic distance acts as a barrier to the spread of financial technology and is inversely associated with the degree of development of financial systems. To this, we add our study, Todea and Petrescu (2021), whose scientific contribution can be found in this doctoral thesis.

There are many directions of research that could be exploited. Thus, it would be interesting and useful to investigate whether the dissemination of global information in stock prices is inversely associated with genetic distance. In this case, genetic distance is a good proxy for long-term cultural distance. A distance-to-wealth measure could also be constructed as a weighted average of the distances between each of the countries in the sample. The weighting could be done using GDP or other proxy variables for wealth. This weighted distance could be an important long-term determinant of capital market integration. Thus, it could be added to the factors already identified by Lehkonen (2015), such as financial openness, institutional environment, and global volatility.

At the same time, one could study the association between genetic diversity, kinship, and market liquidity, respectively the systematic component in liquidity. Such a study would join those in which culture is a determinant of liquidity and how it manifests, such as that conducted by Moshirian et al. (2017).

Last but not least, kinship could be an important determinant of company-specific stock market crashes. These cracks occur especially when the management of companies does not disclose negative information about the company on the market. Their accumulation, followed by their disclosure at a certain point, leads to sharp declines in the stock market price. In societies with tight kinship, it is very likely that the accumulation of this information and the delay in its disclosure on the market will be more pronounced. Such a study would join others in which culture is a determinant of specific stock market crashes (An et al., 2018). We mention that by specific crashes we refer to those sharp decreases in the stock price that are due to specific information from the company and not to the systematic market component, such as financial crises.

Obviously, these research directions are just some of the potential ones. The basic idea is that ancestral factors could be an important variable omitted in studies of capital markets and

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their functioning, and its consideration could explain an important part of the differences that appear in the functioning and price formation. Just demonstrating the association of these ancestral factors with elements related to the capital market is not enough, and identifying mechanisms by which decision-makers can act becomes necessary.

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